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# FCC Test Report

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Report No.: AGC05764201101FE02

**FCC ID** : 2ADRG-BRY703  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Brydge SPX+  
**BRAND NAME** : BRYDGE  
**MODEL NAME** : BRY703  
**APPLICANT** : BRYDGE GLOBAL  
**DATE OF ISSUE** : Nov. 24, 2020  
**STANDARD(S)** : FCC Part 15.247  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 24, 2020	Valid	Initial Release

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## TABLE OF CONTENTS

<b>1. VERIFICATION OF COMPLIANCE</b> .....	<b>5</b>
<b>2. GENERAL INFORMATION</b> .....	<b>6</b>
2.1. PRODUCT DESCRIPTION .....	6
2.2. TABLE OF CARRIER FREQUENCIES .....	6
2.3. RELATED SUBMITTAL(S)/GRANT(S).....	7
2.4. TEST METHODOLOGY .....	7
2.5. SPECIAL ACCESSORIES.....	7
2.6. EQUIPMENT MODIFICATIONS.....	7
2.7. ANTENNA REQUIREMENT .....	7
<b>3. MEASUREMENT UNCERTAINTY</b> .....	<b>8</b>
<b>4. DESCRIPTION OF TEST MODES</b> .....	<b>9</b>
<b>5. SYSTEM TEST CONFIGURATION</b> .....	<b>10</b>
5.1. CONFIGURATION OF TESTED SYSTEM.....	10
5.2. EQUIPMENT USED IN TESTED SYSTEM.....	10
5.3. SUMMARY OF TEST RESULTS.....	10
<b>6. TEST FACILITY</b> .....	<b>11</b>
<b>7. PEAK OUTPUT POWER</b> .....	<b>12</b>
7.1. MEASUREMENT PROCEDURE.....	12
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	12
7.3. LIMITS AND MEASUREMENT RESULT.....	13
<b>8. 6 DB BANDWIDTH</b> .....	<b>15</b>
8.1. MEASUREMENT PROCEDURE.....	15
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	15
8.3. LIMITS AND MEASUREMENT RESULTS.....	15
<b>9. CONDUCTED SPURIOUS EMISSION</b> .....	<b>17</b>
9.1. MEASUREMENT PROCEDURE.....	17
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	17
9.3. MEASUREMENT EQUIPMENT USED .....	17
9.4. LIMITS AND MEASUREMENT RESULT.....	17
<b>10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY</b> .....	<b>25</b>

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10.1. MEASUREMENT PROCEDURE.....	25
10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	25
10.3. MEASUREMENT EQUIPMENT USED .....	25
10.4. LIMITS AND MEASUREMENT RESULT.....	25
<b>11. RADIATED EMISSION .....</b>	<b>27</b>
11.1. MEASUREMENT PROCEDURE.....	27
11.2. TEST SETUP.....	28
11.3. LIMITS AND MEASUREMENT RESULT.....	29
11.4. TEST RESULT.....	29
<b>12. FCC LINE CONDUCTED EMISSION TEST .....</b>	<b>39</b>
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST.....	39
12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST .....	39
12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST.....	40
12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST .....	40
12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST .....	41
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP .....</b>	<b>43</b>
<b>APPENDIX B: PHOTOGRAPHS OF EUT .....</b>	<b>45</b>

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## 1. VERIFICATION OF COMPLIANCE

<b>Applicant</b>	BRYDGE GLOBAL
<b>Address</b>	1912 Sidewinder Dr#104, Park City, Utah 84060, United States
<b>Manufacturer</b>	BRYDGE GLOBAL
<b>Address</b>	1912 Sidewinder Dr#104, Park City, Utah 84060, United States
<b>Factory</b>	Shenzhen Doking Technology Co., Ltd.
<b>Address</b>	Tower A, Building 16, Shapuwei Venture Industrial Zone, Songgang Street, Baoan District, Shenzhen, Guangdong Province, China
<b>Product Designation</b>	Brydge SPX+
<b>Brand Name</b>	BRYDGE
<b>Test Model</b>	BRY703
<b>Date of test</b>	Nov. 17, 2020 to Nov. 23, 2020
<b>Deviation</b>	No any deviation from the test method
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BLE/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Prepared By

*Eddy Liu*

Eddy Liu

(Project Engineer)

Nov. 23, 2020

Reviewed By

*Max Zhang*

Max Zhang

(Reviewer)

Nov. 24, 2020

Approved By

*Forrest Lei*

Forrest Lei

(Authorized Officer)

Nov. 24, 2020

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as a “Brydge SPX+”. It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.402 GHz to 2.480GHz
<b>RF Output Power</b>	0.315dBm (Max)
<b>Bluetooth Version</b>	V5.0
<b>Modulation</b>	BR <input type="checkbox"/> GFSK, EDR <input type="checkbox"/> π/4-DQPSK, <input type="checkbox"/> 8DPSK BLE <input checked="" type="checkbox"/> GFSK 1Mbps <input type="checkbox"/> GFSK 2Mbps
<b>Number of channels</b>	40 Channel
<b>Antenna Designation</b>	PCB Antenna (Comply with requirements of the FCC part 15.203)
<b>Antenna Gain</b>	1.5dBi
<b>Hardware Version</b>	V1.1
<b>Software Version</b>	V04
<b>Power Supply</b>	DC 3.7V by battery
Note: The EUT doesn't support BR/EDR.	

### 2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHz	0	2402 MHz
	1	2404 MHz
	:	:
	38	2478 MHz
	39	2480 MHz

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### 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2ADRG-BRY703** filing to comply with the FCC Part 15.247 requirements.

### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.  
For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.1$  dB
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 4.0$  dB
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8$  dB
- Uncertainty of total RF power, conducted,  $U_c = \pm 0.8$  dB
- Uncertainty of RF power density, conducted,  $U_c = \pm 2.6$  dB
- Uncertainty of spurious emissions, conducted,  $U_c = \pm 2.7$  dB
- Uncertainty of Occupied Channel Bandwidth:  $U_c = \pm 2$  %

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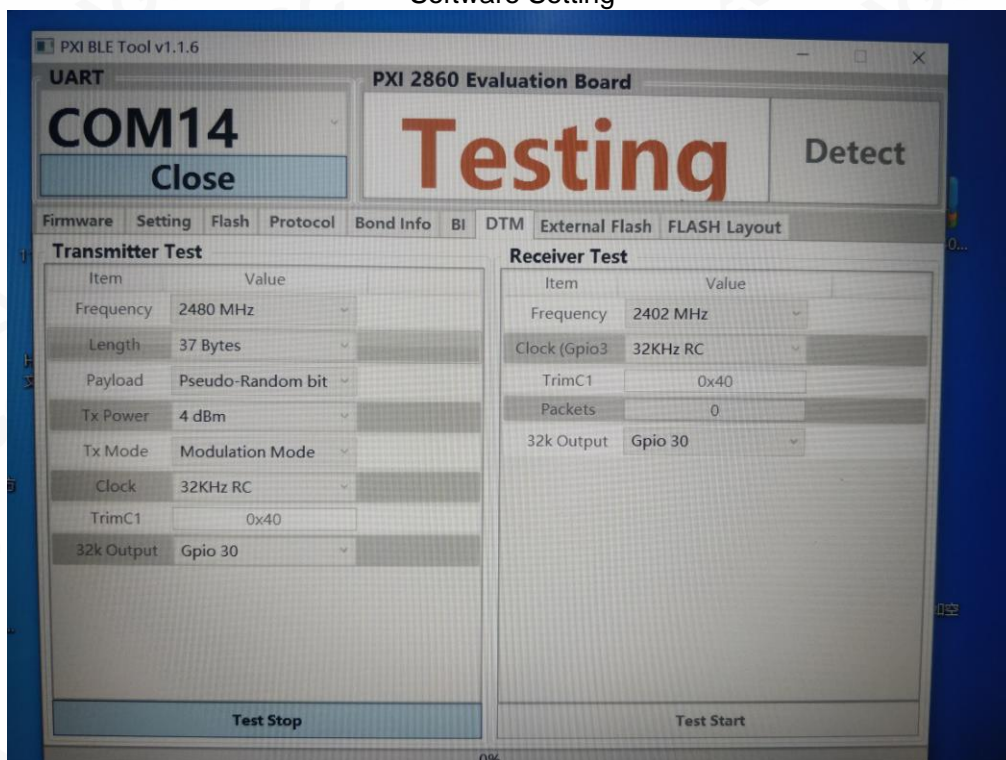
#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

#### Software Setting



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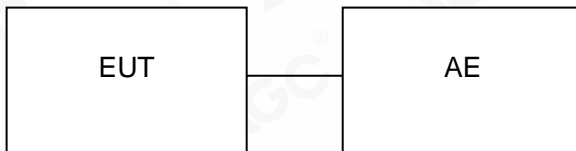
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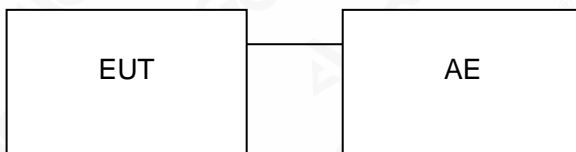
## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



### 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Brydge SPX+	BRY703	2ADRG-BRY703	EUT
2	Control Box	N/A	USB-TTL	AE
3	USB Cable	N/A	0.8m unshielded	Accessory
4	Adapter	N/A	N/A	AE

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Compliant

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## 6. TEST FACILITY

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03, 2020	Jul. 02, 2021
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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## 7. PEAK OUTPUT POWER

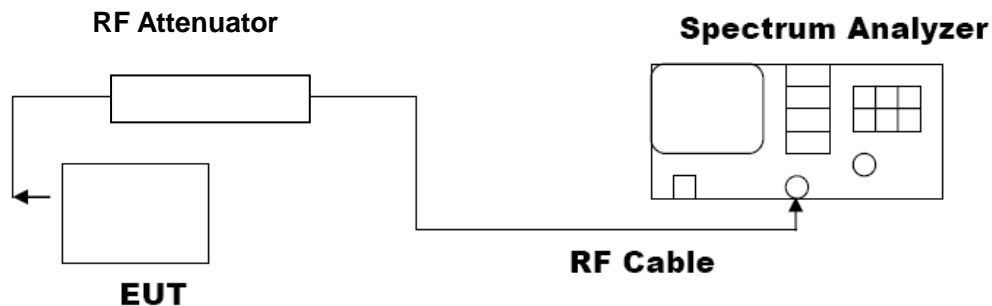
### 7.1. MEASUREMENT PROCEDURE

For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2.  $RBW \geq DTS$  bandwidth
3.  $VBW \geq 3 * RBW$ .
4.  $SPAN \geq VBW$ .
5. Sweep: Auto.
6. Detector function: Peak.
7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP

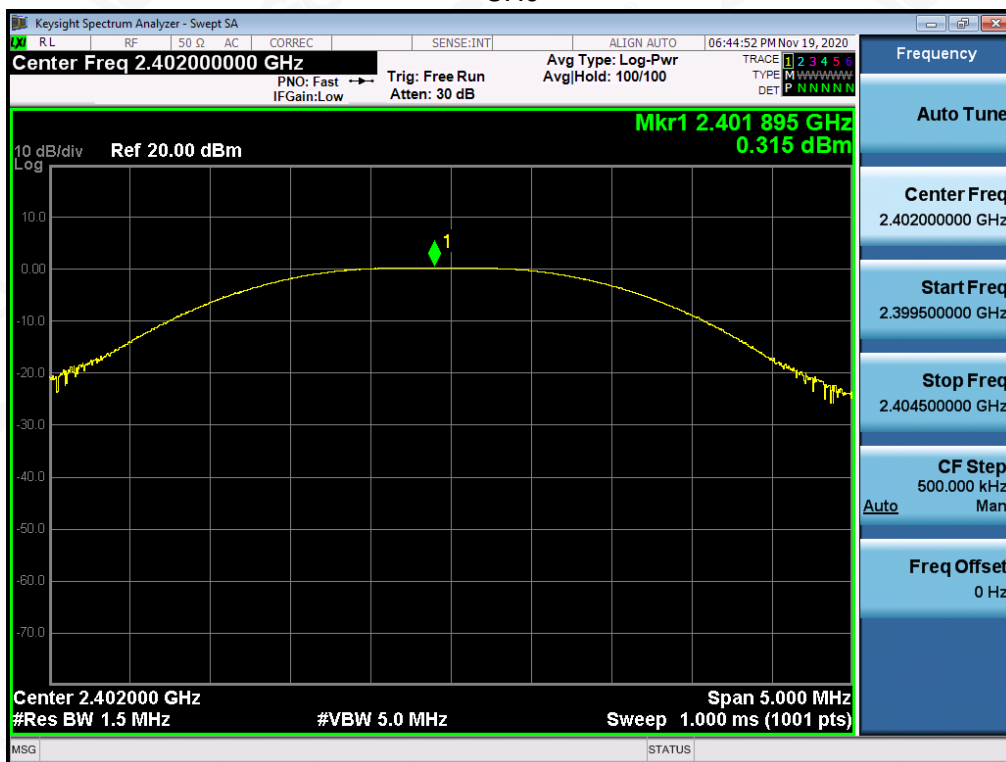


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### 7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MODULATION			
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	0.315	30	Pass
2.440	-0.742	30	Pass
2.480	-1.745	30	Pass

CH0

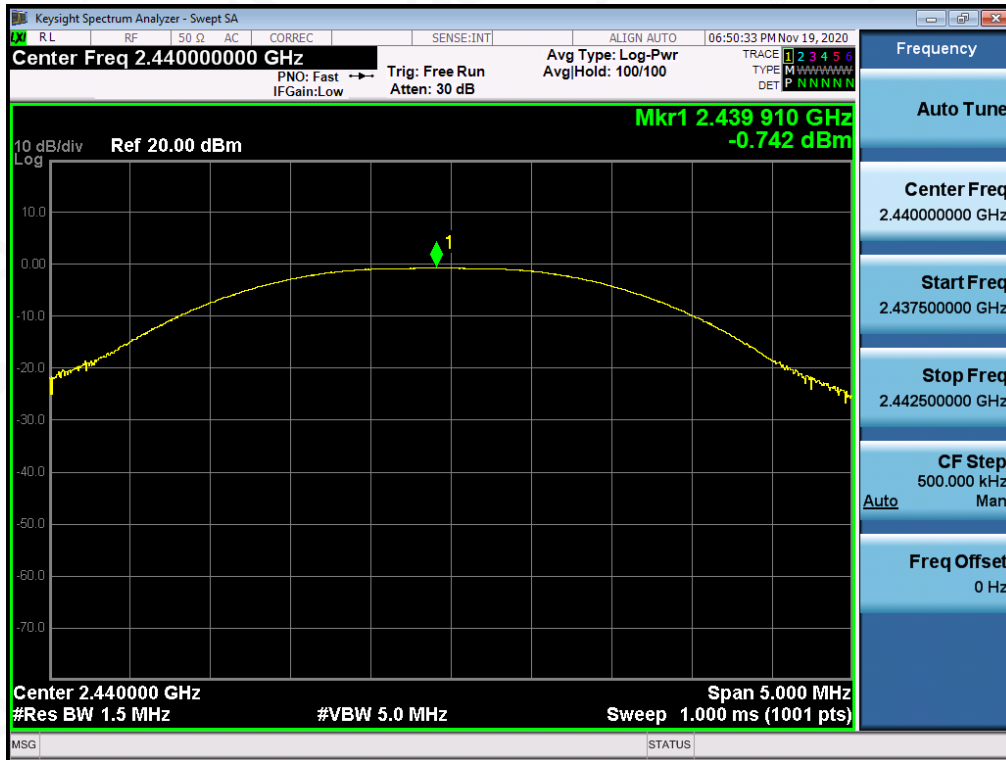


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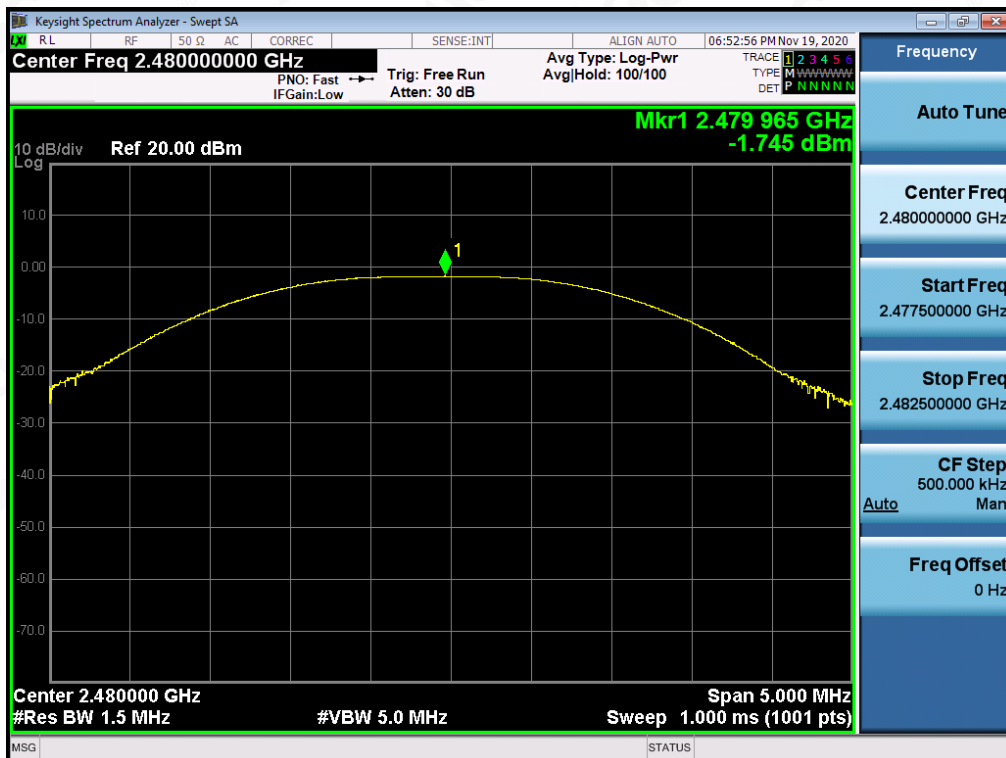
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CH19



CH39



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## 8. 6 DB BANDWIDTH

### 8.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW $\geq$ 3 $\times$ RBW.
4. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

### 8.3. LIMITS AND MEASUREMENT RESULTS

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (kHz)		Criteria
>500KHZ	Low Channel	783.7	PASS
	Middle Channel	761.7	PASS
	High Channel	769.4	PASS

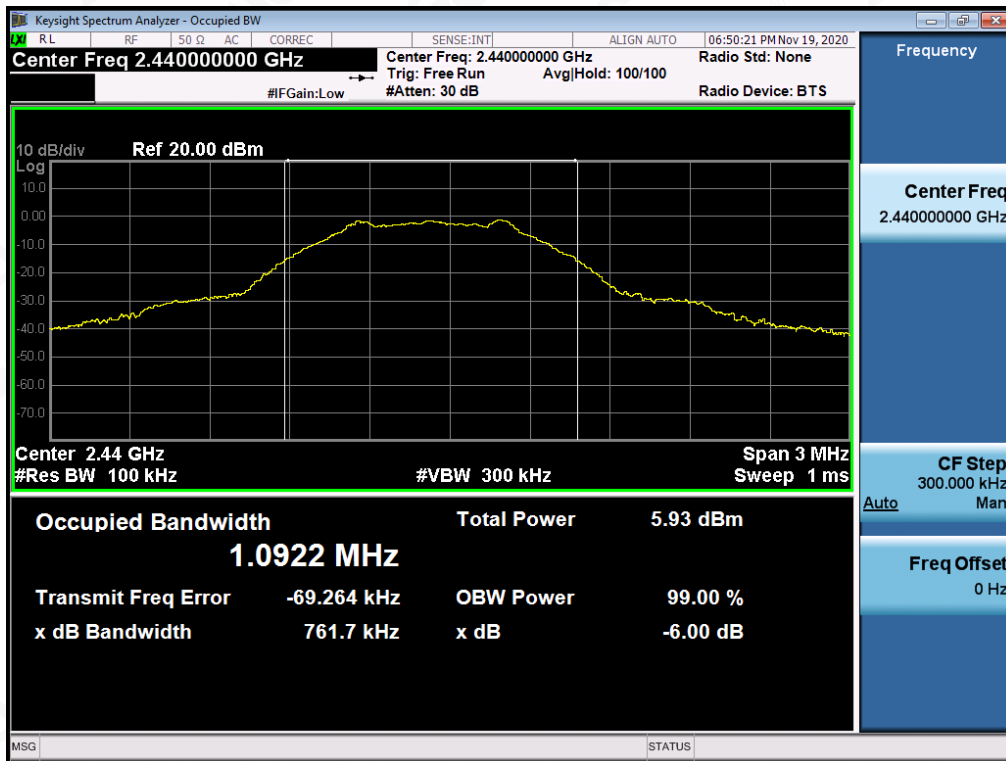
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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## 9. CONDUCTED SPURIOUS EMISSION

### 9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

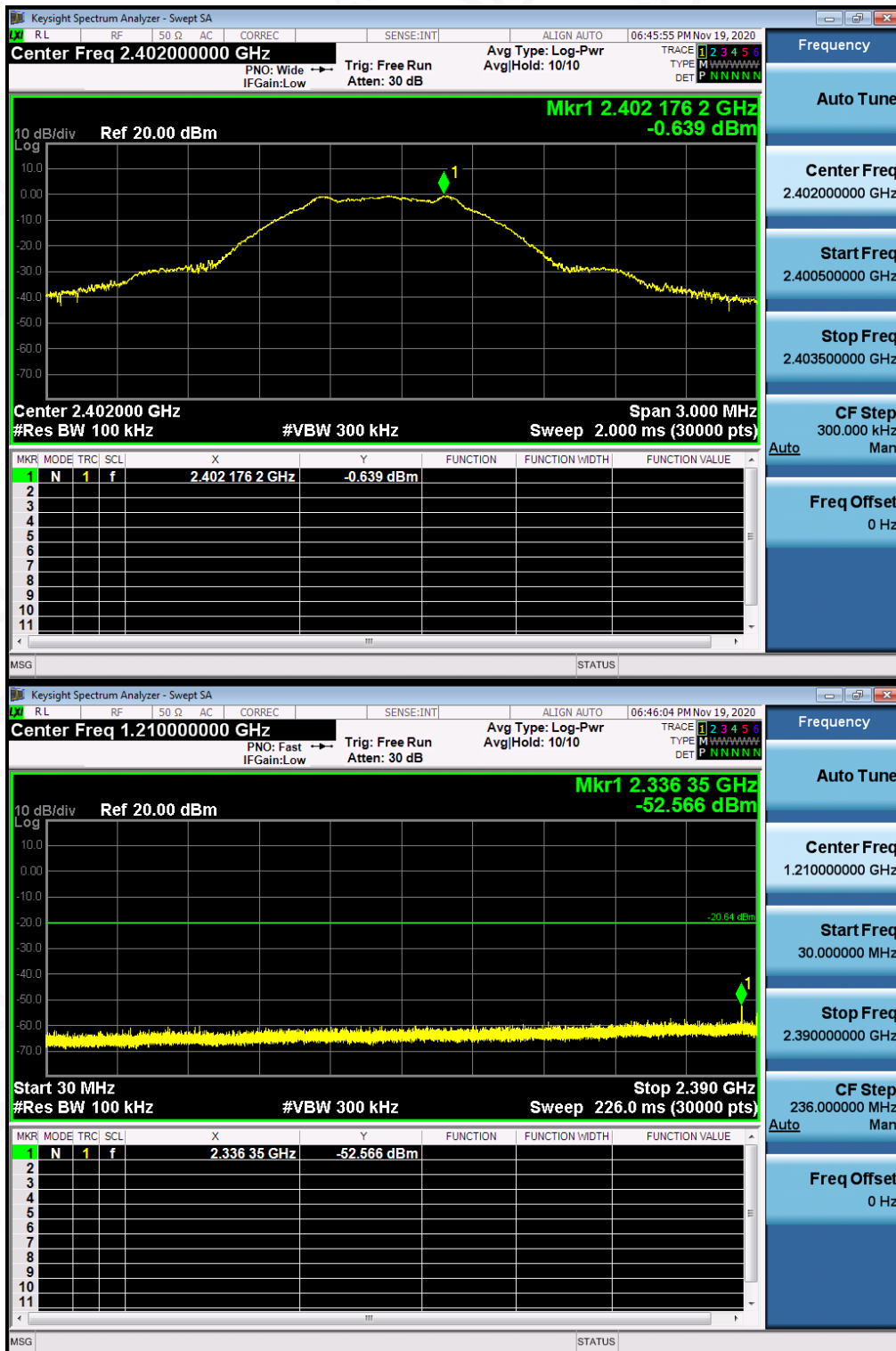
### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS

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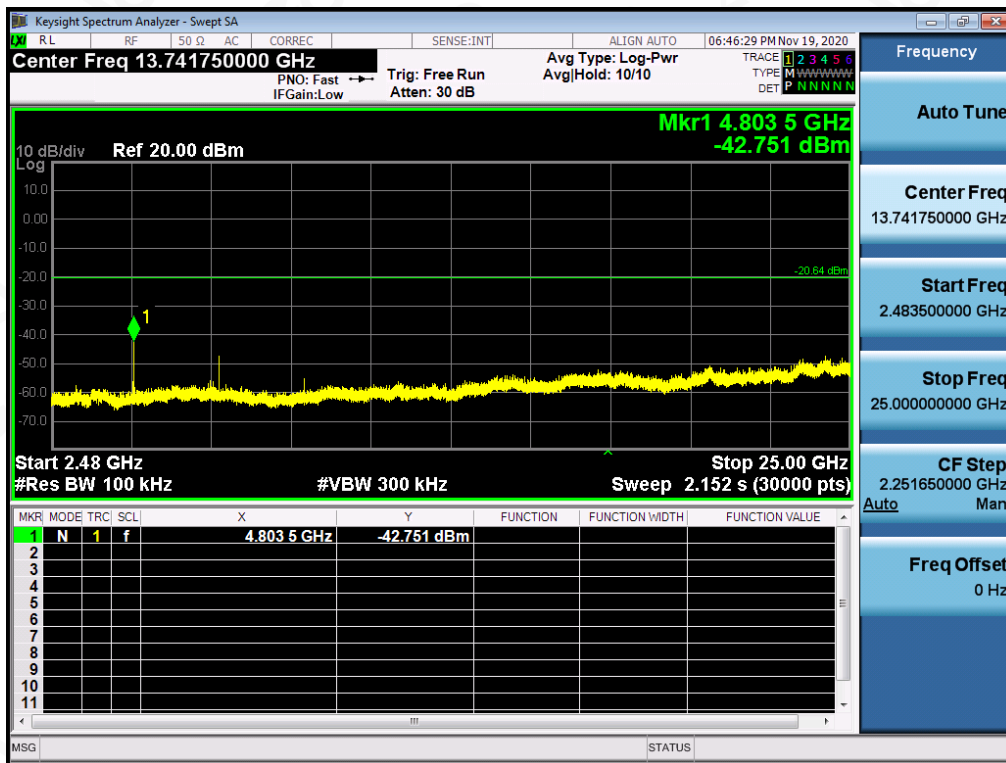
### TEST RESULT FOR ENTIRE FREQUENCY RANGE GFSK MODULATION IN LOW CHANNEL



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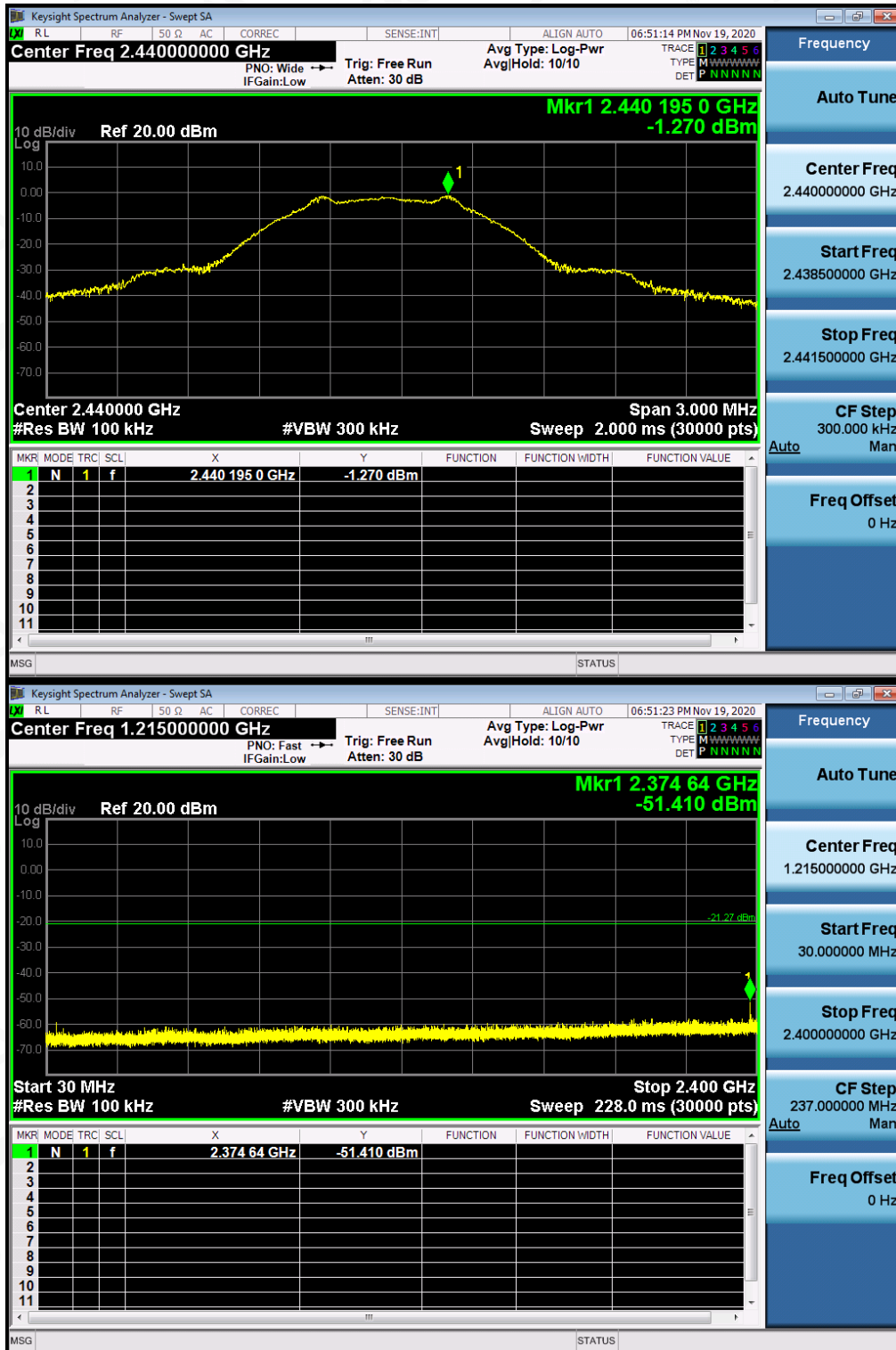


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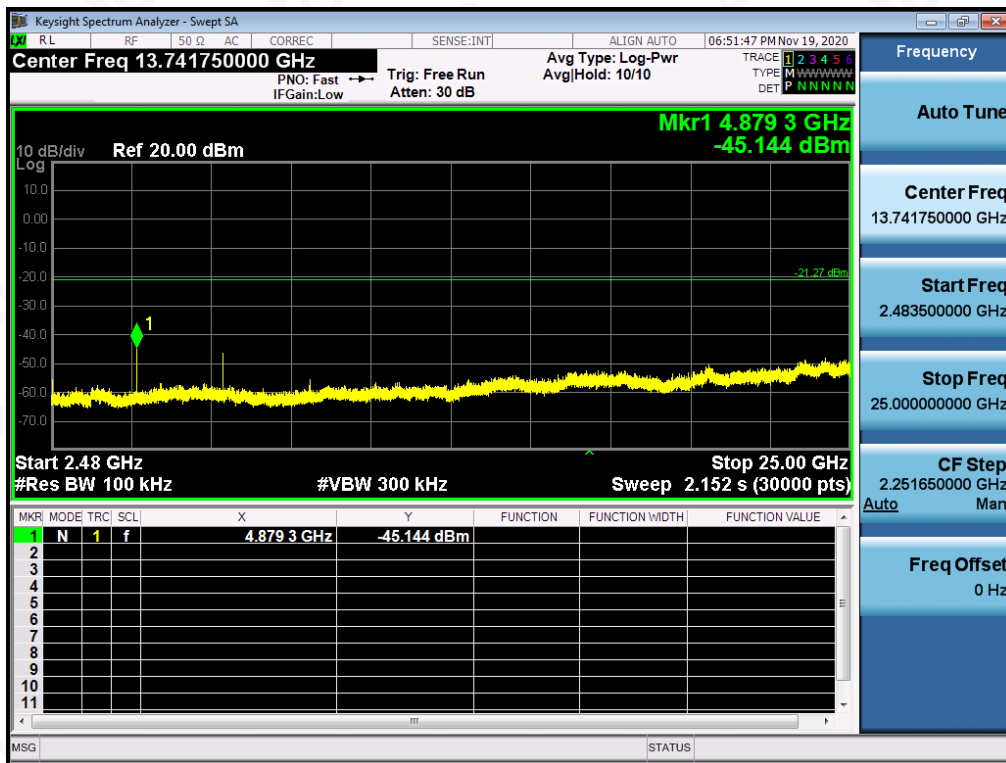
### GFSK MODULATION IN MIDDLE CHANNEL



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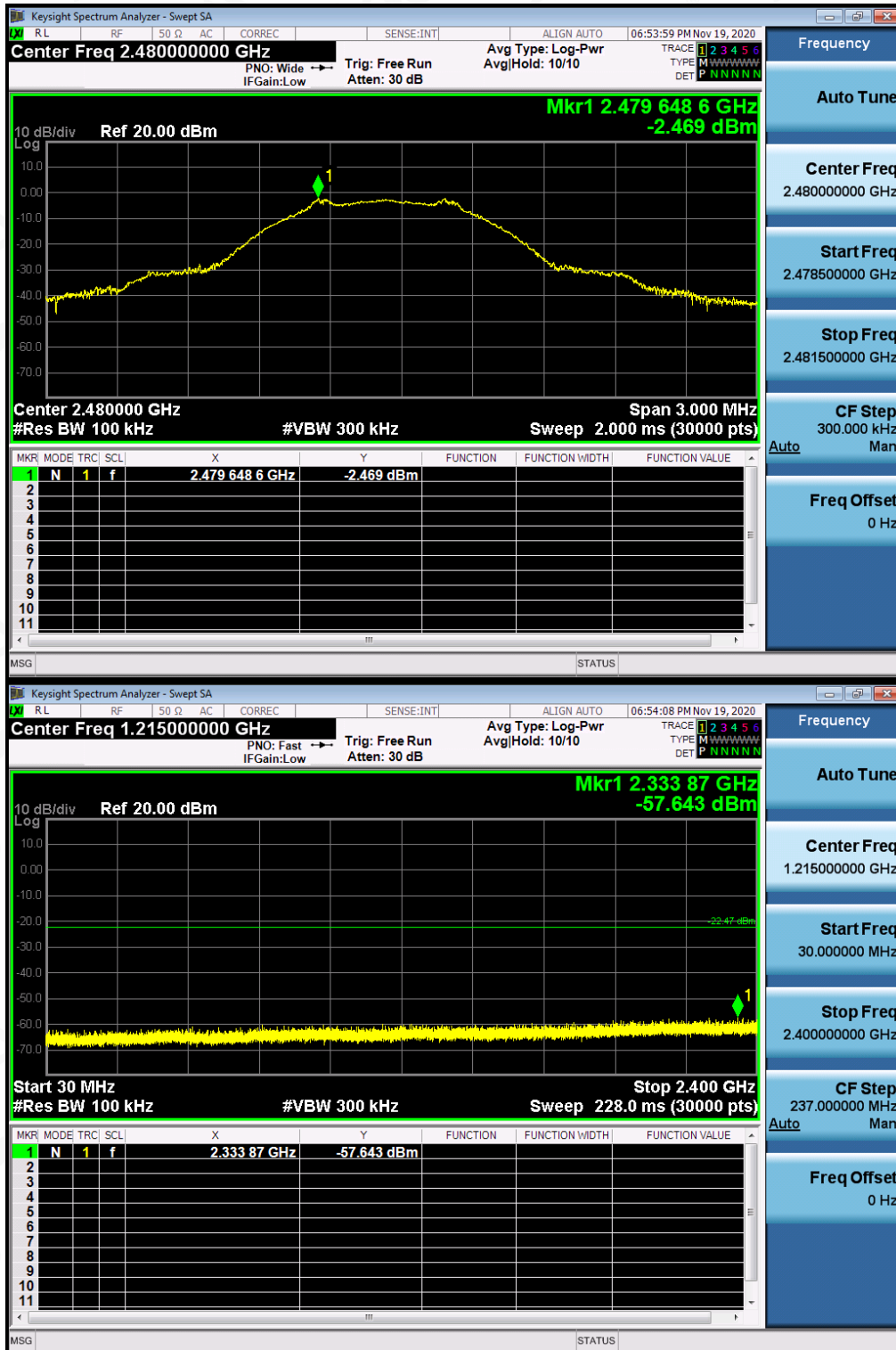


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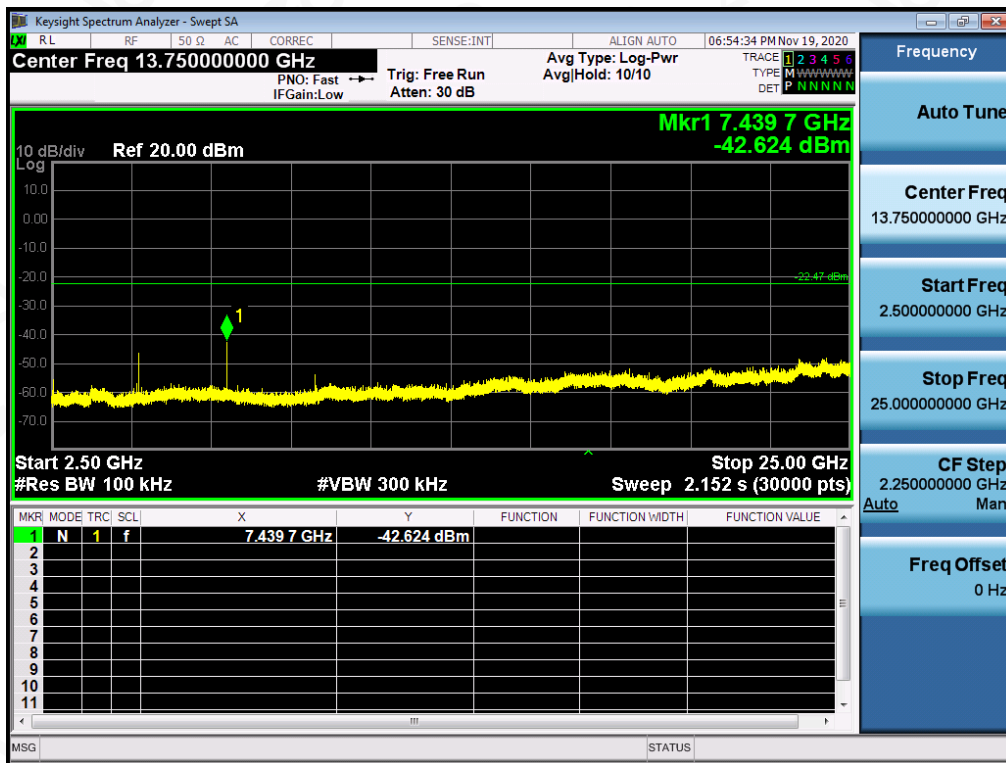
### GFSK MODULATION IN HIGH CHANNEL



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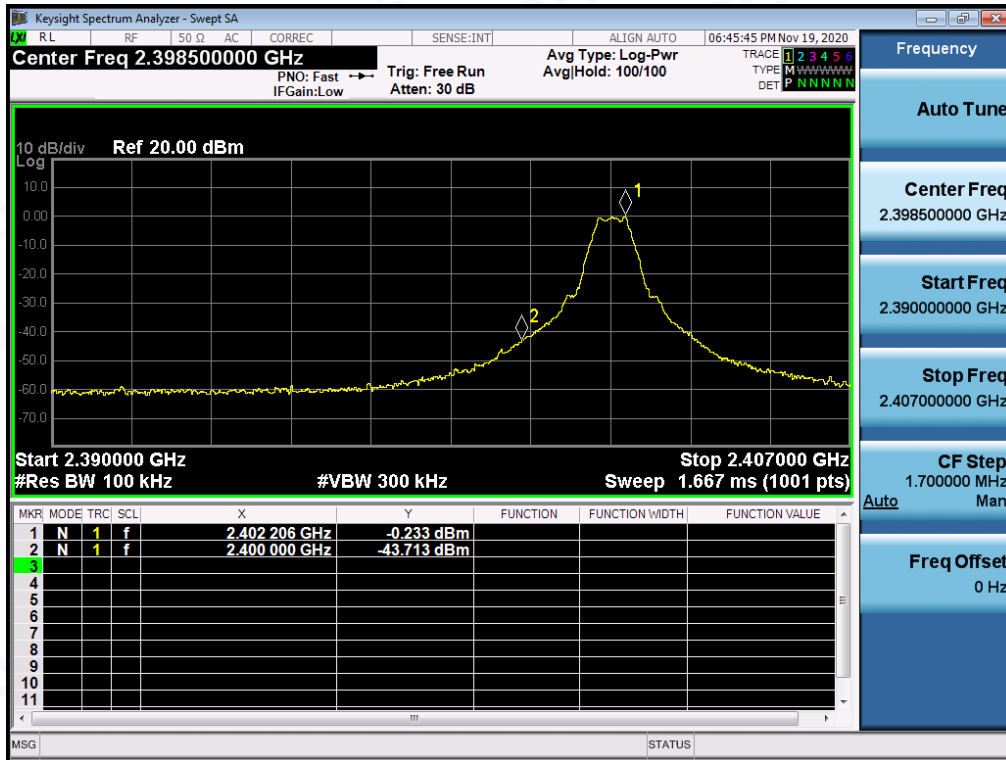
Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit.

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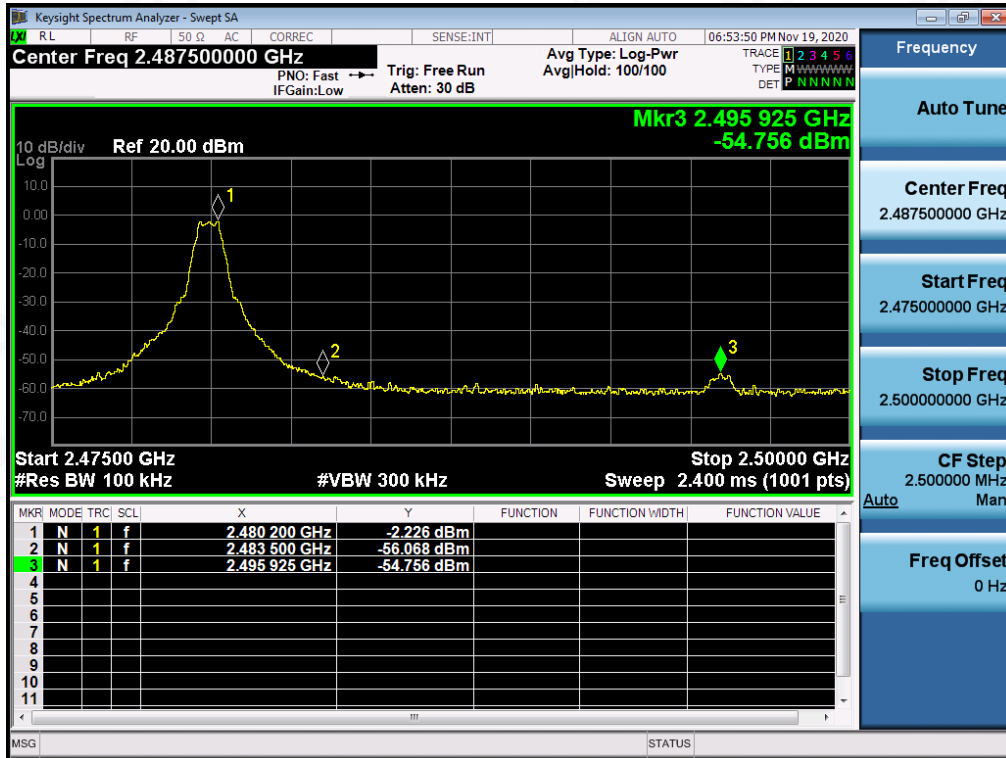
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### TEST RESULT FOR BAND EDGE GFSK MODULATION IN LOW CHANNEL



### GFSK MODULATION IN HIGH CHANNEL



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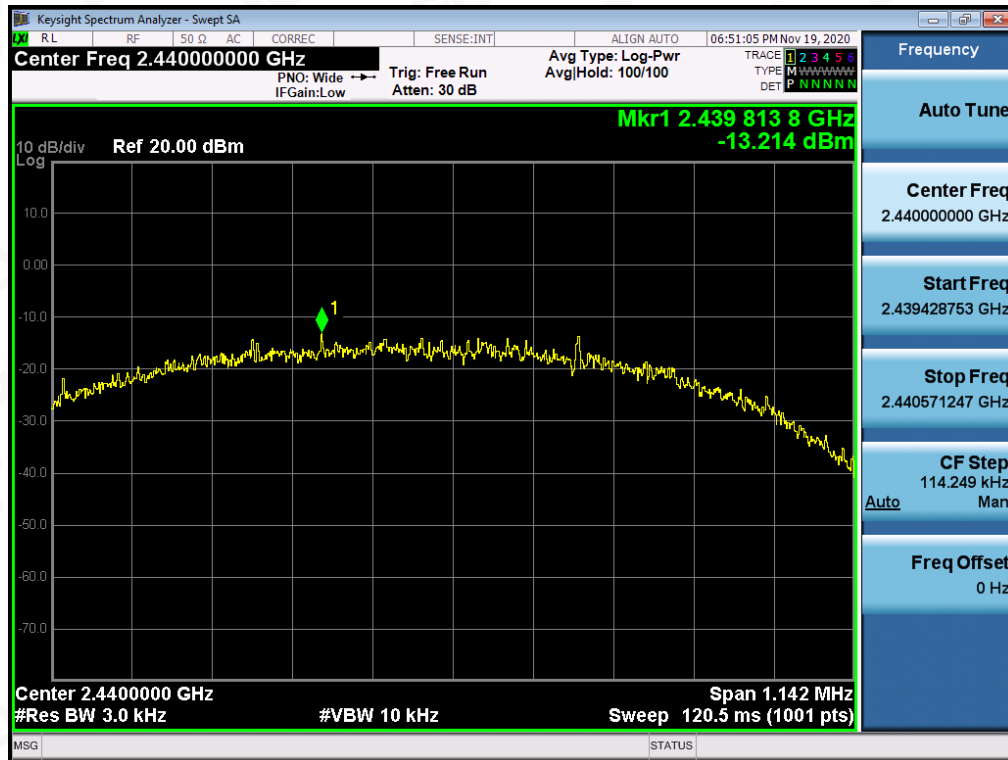
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### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



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## 11. RADIATED EMISSION

### 11.1. MEASUREMENT PROCEDURE

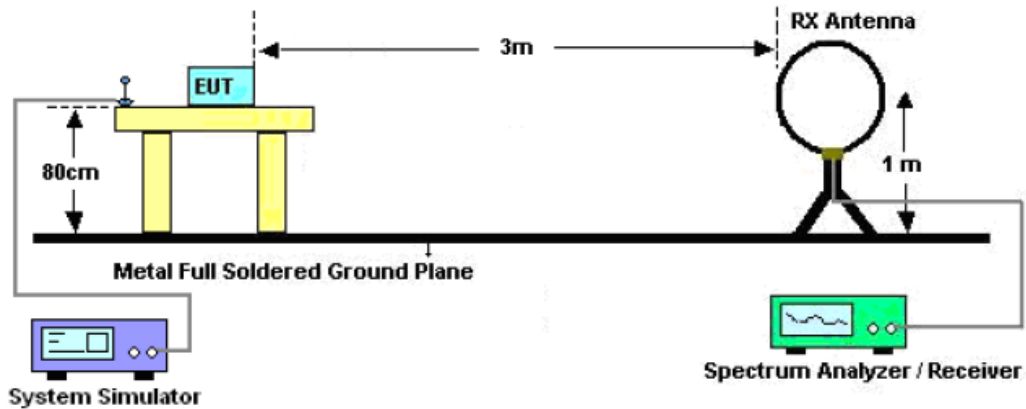
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

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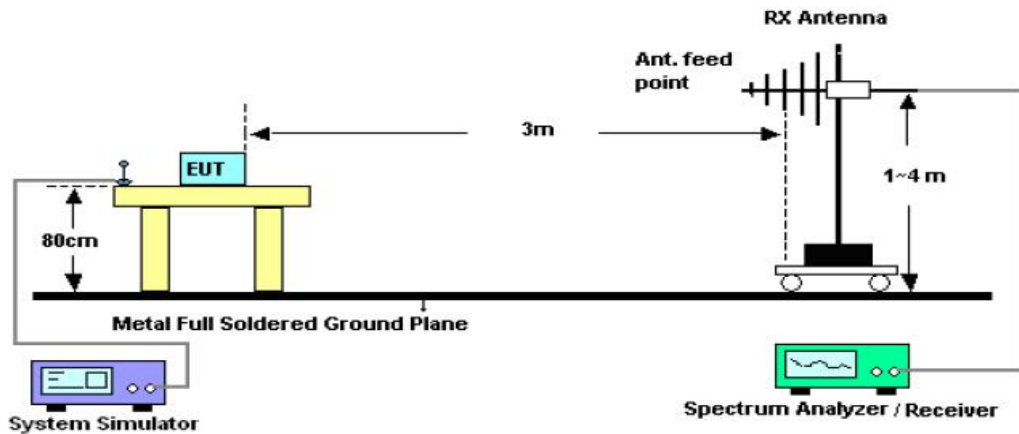


### 11.2. TEST SETUP

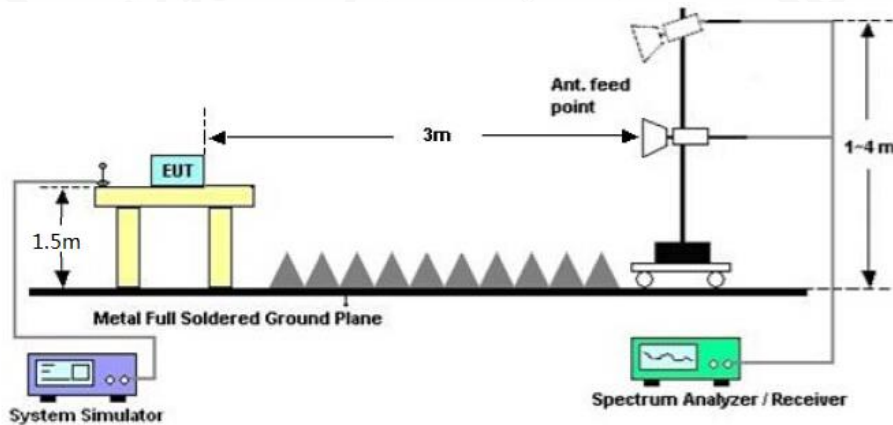
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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### 11.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

### 11.4. TEST RESULT

#### RADIATED EMISSION BELOW 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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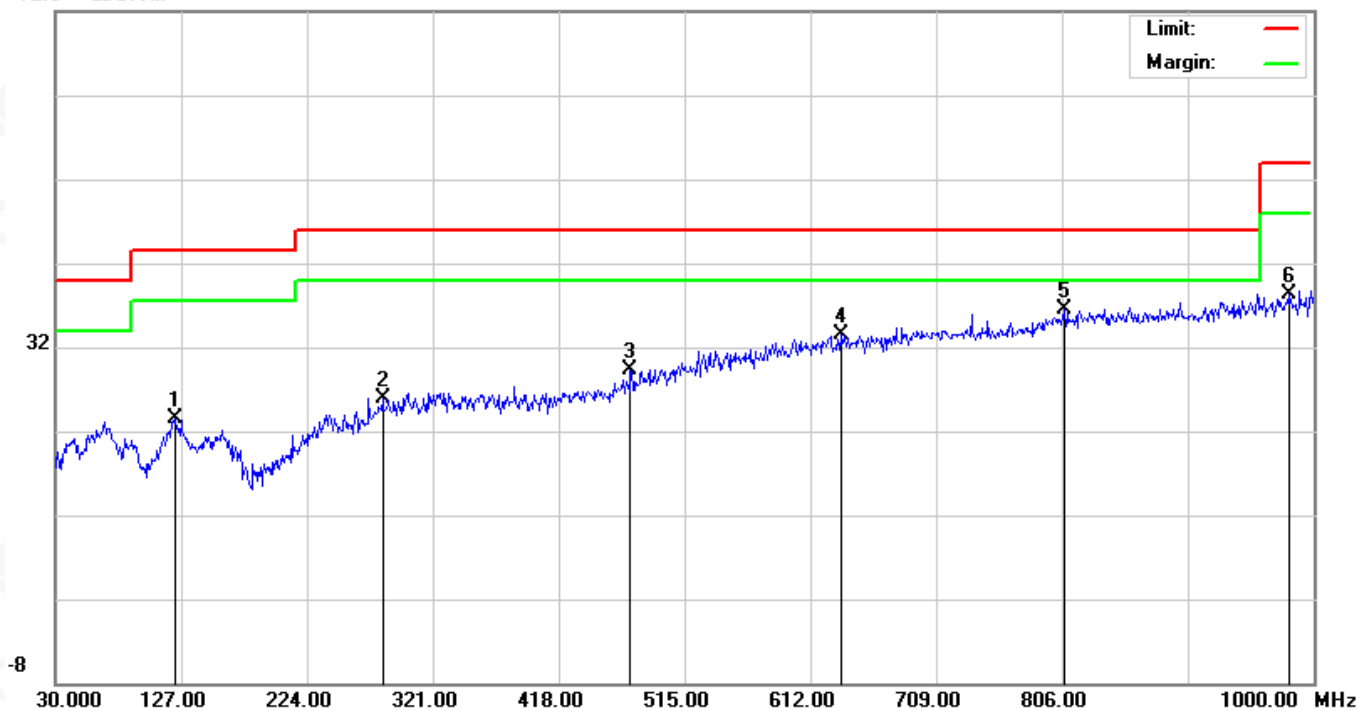
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**RADIATED EMISSION BELOW 1GHZ**

<b>EUT</b>	Brydge SPX+	<b>Model Name</b>	BRY703
<b>Temperature</b>	25° C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Horizontal

72.0 dBuV/m



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		122.1500	5.84	17.57	23.41	43.50	-20.09	peak
2		282.1999	5.79	20.11	25.90	46.00	-20.10	peak
3		473.2900	5.30	23.92	29.22	46.00	-16.78	peak
4		635.2798	6.11	27.37	33.48	46.00	-12.52	peak
5	*	807.9400	6.02	30.51	36.53	46.00	-9.47	peak
6		980.6000	5.98	32.39	38.37	54.00	-15.63	peak

**RESULT: PASS**

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